UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

FILE COPY

FEB 12 1993

Publication #93-10-212

Reply to
Attn of: WD-139

MEMORANDUM

SUBJECT: Recommendation for TMDL Approvals

Crystal Creek - mouth to confluence with west and middle forks - Waterbody Segment No. WA-32-1037.

TMDL Parameters: Ammonia-Nitrogen, Biochemical Oxygen Demand, Total Residual Chlorine, Fecal Coliform Bacteria.

FROM: Rob Pedersen, Environmental Engineer
Environmental Characterization Program

TO: File

- TMDL submitted 9 March 1992
- TMDL package completed 28 January 1993
  - EPA Approval Checklist
  - Document 1: Transmittal letter
  - Document 2: TMDL document
  - Document 3: Joy, J. 1985. "Roslyn Wastewater Lagoons and Crystal Creek Receiving Water Study - Findings." Memorandum of October 21 to Chris Haynes and Harold Porath, Washington Department of Ecology, Olympia, WA.

    Willms, R. 1991. "Roslyn Post-Upgrade Wastewater Treatment Plant Limited Class II Inspection and Receiving Water Study on Crystal Creek." Washington Department of Ecology, Olympia, WA. 47pp.

Transmittal letter - Complete (see Document 1)

- States that TMDLs have been established in accordance

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, WD-139
Seattle, Washington 98101

NOTICE OF APPROVAL OF TOTAL MAXIMUM DAILY LOADs (TMDLs) TO CONTROL AMMONIA-NITROGEN, RESIDUAL CHLORINE, FECAL COLIFORM BACTERIA AND BIOCHEMICAL OXYGEN DEMAND IN CRYSTAL CREEK TO MEET WASHINGTON WATER QUALITY STANDARDS

On March 9, 1992, the Washington Department of Ecology submitted TMDLs for Crystal Creek (Waterbody Segment WA-32-1037) to EPA for review. The Crystal Creek TMDLs establish load and wasteload allocations for: ammonia-nitrogen levels, to meet Washington's water quality standards for unionized ammonia-nitrogen toxicity; residual chlorine, to eliminate instream chlorine toxicity; fecal coliform bacteria, to meet the secondary contact recreation standard; and biochemical oxygen demand (BOD), to ensure compliance with dissolved oxygen criteria. EPA approved these TMDLs on February 12, 1993.

The TMDLs will be implemented primarily through point source control. The city of Roslyn has been identified as the major point source of ammonia-nitrogen, chlorine, fecal coliform bacteria, and biochemical oxygen demand to Crystal Creek. Wasteload allocations for these pollutants will be incorporated into the National Pollutant Discharge Elimination System permit (NPDES Permit No. WA-002233-1) for the city of Roslyn.

The TMDLs and related documents are on file and may be reviewed at the above address any time between 8:30 a.m. and 4:00 p.m., Monday through Friday. Copies of the TMDLs may be requested by writing to EPA at the above address to the attention of Amber Wong, Surface Water Branch.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

FILE COPY

FEB 12 1993

Reply to
Attn of: WD-139

MEMORANDUM

SUBJECT: Recommendation for TMDL Approvals

Crystal Creek - mouth to confluence with west and middle forks - Waterbody Segment No. WA-32-1037.

TMDL Parameters: Ammonia-Nitrogen, Biochemical Oxygen Demand, Total Residual Chlorine, Fecal Coliform Bacteria.

FROM: Rob Pedersen, Environmental Engineer
Environmental Characterization Program

TO: File

- TMDL submitted 9 March 1992
- TMDL package completed 28 January 1993
  - EPA Approval Checklist
  - Document 1: Transmittal letter
  - Document 2: TMDL document
  - Document 3: Joy, J. 1985. "Roslyn Wastewater Lagoons and Crystal Creek Receiving Water Study - Findings." Memorandum of October 21 to Chris Haynes and Harold Porath, Washington Department of Ecology, Olympia, WA.

    Willms, R. 1991. "Roslyn Post-Upgrade Wastewater Treatment Plant Limited Class II Inspection and Receiving Water Study on Crystal Creek." Washington Department of Ecology, Olympia, WA. 47pp.

Transmittal letter - Complete (see Document 1)

- States that TMDLs have been established in accordance

with Section 303(d)(1) of the Clean Water Act.

- **Review note: meets requirements.**

Problem Assessment - Complete (see Document 2, and 3)

- Crystal Creek is a Class A stream. The creek drains 7.7 square miles of forested foothills in its three mile course. Stream width averages 2-6 feet and 0.5 foot depth. Typical low flows are approximately 2 cfs; the 7Q10 is 0.53 cfs. The creek enters the Yakima River at RM 183.1 near Cle Elum.

- Principle pollutant sources are leaking sewer lines in the town of Roslyn (population about 970), and downstream, effluent from the town's sewage treatment lagoons (RM 1.55) combining with effluent from an old coal mine (contributes primarily inorganic nitrogen). Possible pollutant sources are pasture areas, spring sources, and upstream of Roslyn, the town of Ronald (population 150).

  Plans are to treat Ronald's sewage at Roslyn's WWTP. The Roslyn WWTP consists of three five acre lagoons, two aeration basins and a chlorine contact chamber; the facility can handle Ronald's sewage.

- Receiving water studies in September 1990 (Document 3) examined the impact of the treatment plant discharge and direct seepage/discharge upstream of the plant in Roslyn. Class A violations were fecal coliform bacteria (FC) near Roslyn (RM 3.0 to 1.55), total residual chlorine (TRC) below the WWTP, and temperature (instream temperature change due to warm lagoon effluent). Other water quality impacts were a slight dissolved oxygen (DO) sag (8 mg/l criteria was still met), and nutrient loading. The creek was nitrogen limited below the WWTP discharge, nitrate improved below the discharge and ammonia levels were below the criteria (the plant demonstrated 99 percent removal, probably due to algal assimilation).

  Although improved, inflow and infiltration (I&I) problems and evidence of direct discharge within Roslyn were still present. The effluent essentially had no impact on the stream's benthic invertebrates; substantial trout populations (including pollution intolerant species) were present.

- **Review notes: Problem assessment accurately gives background information, identifies exceedences of water quality standards for FC and TRC toxicity. Also**

highlighted are potential DO problems due to BOD_5 loading and ammonia toxicity at other times of year (survey was in September).

TMDL document - Complete (see Document 2; and Willms, 1991 under Document 3).

- After the 1990 WWTP and receiving water survey (Document 3), worst case water quality modeling predicted standard violations for TRC, ammonia-nitrogen, FC and DO. Modeling assumed WWTP discharge restricted to 0.80 mgd, and dilution ratios of 1:16 for the 7Q10 and 1:21 for the 1Q10. These stringent assumptions resulted in water quality-based limits nearly equating to water quality standards at 0.80 mgd discharge.

- To maintain water quality standards under the above conditions, the following instream loading capacities (LC), nonpoint load allocations (LA) and point source waste load allocations (WLA) were developed:

	LC	LA	WLA
TRC	0.08	0	0.08
NH_3-N	9.75	0.05	9.70
BOD_5	116	3	113
FC	49,400	8800	41,400

FC in "colony forming units/sec", all other units in "lbs./day".

- Water quality-based limits will be in effect from June to October until I&I problems are corrected. Post I&I correction, the limits will apply year round.

- **Review note: Clearly identifies the wasteload capacity for the TMDLs for ammonia-N, residual chlorine, FC and BOD_5. References the supporting ambient monitoring data. Instream FC monitoring is required until I&I problems are alleviated. Effluent monitoring for ammonia-nitrogen is also required.**

  Roslyn has the option drawing down the lagoons during spring when instream dilution is high. This could lead to no discharge during summer months and would directly address temperature and TRC violations due to wastewater discharge.

Supporting Studies - Complete (see Document 3)

- Water quality surveys were used in conjunction with water quality modeling to develop the TMDLs discussed above. The coal mine drainage does not contribute to

projected standards violations. The only observed violations were: FC near Roslyn, TRC below the allowed mixing zone and temperature. Worst case modeling pointed to DO and ammonia toxicity violations.

- Benthic invertebrate analysis and information on resident trout indicated a biologically healthy environment. In theory, instream TRC levels could be problematic for salmonids during worst case conditions.

- **Review notes: Documentation gives a thorough analysis of observed and modeled downstream effects due to ammonia, TRC and oxygen demanding materials. FC sources were also identified. The proposed TMDLs will maintain water quality standards.**

Public participation -

- Public notice will be provided when the wasteload allocation for the city of Roslyn is implemented in its NPDES permit. The permit is scheduled to be issued in 1995. Permit conditions will reflect the TMDL requirements.

- **Review notes: Although not yet issued, the Roslyn permit will contain the water quality-based limitations that are consistent with the TMDL, according to its wasteload allocation. Adequate public notice will be provided in the NPDES permit issuance process.**

Enforceability -

- NPDES Permit No. WA-002233-1, city of Roslyn WWTP, to be issued in 1995.

- Once approved by EPA, the TMDL becomes part of the state's Water Quality Management Plan.

- **Review notes: Valid supporting documentation for proposed permit: TMDLs and wasteload allocations.**

TMDL effectiveness plan - Complete (see Documents 2 and 3)

- Several recommendations were made in the report by Willms (Document 3). The major recommendations included: investigate and correct I/I problems; institute dechlorination, effluent diversion, or an alternative method of disinfection to avoid chlorine toxicity; require instream and effluent monitoring for TMDL parameters; implement the wasteload allocations through the permit; consider storing effluent for discharge during higher flows; allow the town of Ronald

to hook up to the Roslyn treatment plant. Ambient and effluent monitoring should be used to ensure the effectiveness of the TMDL.

- **Review notes: Adequate monitoring and followup to assess compliance with the TMDLs.**

Additional Information

- Water quality modeling, the resultant TMDLs and the proposed permit conditions represent very stringent requirements for the town of Roslyn. Maintenance and enhancement of Crystal Creek's biological integrity is assured with these TMDLs.

- Crystal Creek is part of Ecology's new "Basin Planning Structure". Any conditions that result from basin planning will be incorporated in Roslyn's NPDES permit, including BMPs, as appropriate, and TMDL requirements for protection of Crystal Creek.

- **Review notes: The TMDLs will protect for water quality standards in Crystal Creek.**

Recommendation, approve TMDLs.

ERP, 01/29/93

TOTAL MAXIMUM DAILY LOAD

Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Developed pursuant to 40 CFR 130.7 and the Federal Clean Water Act

---

WATERBODY SEGMENT: WA-39-1037

Crystal Creek

(mouth at Yakima RM 183.1 to confluence of west and middle forks at RM 3.0)

RECEIVING SYSTEM INFORMATION:

Basin: Upper Yakima
County: Kittitas

TMDL PARAMETER:

Fecal Coliform

APPLICABLE RULES:

WAC 173-201-045(2)(c)(i)(A)

SOURCES COVERED BY THIS TMDL:

Allocation Type	Source Description
WLA	City of Roslyn WWTP
LA	Crystal Creek Tributaries

TMDL:

A loading capacity for fecal coliform of 49,900 colony forming units per second to Crystal Creek has been determined. This loading rate has been shown to be consistent with the state water quality standard for fecal coliform at a 7Q10 design flow of 0.53 cfs. The recommeded LA is 8,800 colony forming units per second and the recommended WLA is 41,100 collony forming units per second.

Technical Documents:

Willms, R. 1991. Roslyn Post-Upgrade Wastewater Treatment Plant Limited Class II Inspection and Receiving Water Study. Washington State Department of Ecology, Olympia WA.

Joy, J. 1985. Roslyn Wastewater Lagoons and Crystal Creek Receiving Water Study - Finding. Memorandum of October 21 to C. Haynes and H. Porath.

Washington State Department of Ecology, Olympia, WA.

Implementation:

It is likely that the wastewater from the nearby city of Ronald will be added to the discharge. The NPDES permit issuance incorporating the WLA has been postponed until the interceptor is completed. Public notice of the TMDL will be held in conjunction with the permit issuance.

Monitoring:

There are currently no plans for post-implementation monitoring of Crystal Creek.